

14 said second film section is a water vapor barrier that
15 hinders water vapor from permeating into said insulation
16 packet through said second film section, and
17 said first film section is a water vapor permeable
18 film that allows water vapor to permeate out of said
19 insulation packet through said first film section.

REMARKS :

- 1) Referring to item 15) of the Office Action Summary, please note that this PCT National Phase Application does not include a claim for domestic priority of a prior domestic application under 35 U.S.C. §120 and/or §121.
- 2) Referring to item 10) of the Office Action Summary, and section 1 on page 2 of the Office Action, a proposed correction of the drawings is enclosed together with a cover letter to the Official Draftsperson. As shown in the hand-marked correction of Fig. 1, Fig. 1 is to be labeled as --PRIOR ART-- as required by the Examiner. Approval of this correction is respectfully requested. Proper corrected formal drawings will then be filed.

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- 3) This application is a National Phase of a PCT International Application. According to the PCT procedures, the original specification text of this application was a literal translation of the original PCT International Application text. This, of course, resulted in some informalities of the specification with respect to U. S. requirements. The specification has now been amended in an editorial and formal manner to better comply with U. S. formal requirements, as well as standard U. S. grammar, sentence construction, and the like. The amendments are all merely editorial and formal in nature, and are supported by the substance and the context of the original disclosure including the original description, claims and drawings. No new matter has been introduced.
- 4) In view of the number and the nature of the amendments, the amendments have all been incorporated in the enclosed Substitute Specification in accordance with 37 C.F.R. §1.125(b). Also enclosed is a Marked-Up Version of the specification showing the matter being added to and the matter being deleted from the specification of record. The Substitute Specification incorporates all the same changes as shown in the Marked-Up Version. The Substitute Specification includes no new matter. Entry of the Substitute Specification is respectfully requested.
- 5) The claims have been amended as follows. All prior claims have been cancelled. New claims 20 to 44 have been introduced. The new claims are based on the subject matter of the original claims

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and disclosure as shown in the following table, and do not introduce any new matter. Entry and consideration of the new claims are respectfully requested.

New Claims	20	21	22	23	24	25	26
Original Support	Cl.1; Fig.3; pg.5, ln.23- pg.6, ln.19	Cl.1,2; Fig.3; pg.5, ln.23- pg.6, ln.19	Fig.3	Fig.3	Fig.2; Cl.1,3-5; pg.8, ln.7-18; pg.9, ln.17- pg.10, ln.5	pg.6, ln.11-14; pg.10, ln.20-24	Fig.3

New Claims	27	28	29	30	31	32	33
Original Support	Fig.3	pg.1, ln.11-12; pg.3, ln.15-16	Cl.10,17	Cl.11,18	Cl.1, Fig.2,3; pg.8, ln.7-18; pg.9, ln.17- pg.10, ln.5	Cl.2	Cl.3

New Claims	34	35	36	37	38	39
Original Support	Cl.3	Cl.11,18	Cl.4,5, 11,16,18	Cl.4,5	Cl.6,13	Cl.7,14; pg.8, ln.3-6

New Claims	40	41	42	43	44
Original Support	Cl.8,15	Cl.12,19	Cl.10,17	Fig. 2; Cl.4,5; pg.8, ln.7-18; pg.9, ln.17- pg.10, ln.5	Fig.2; Cl.1,4,5; pg.8, ln.7-18; pg.9, ln.17- pg.10, ln.5

- 6) Referring to sections 2 and 3 on pages 2 and 3 of the Office Action, the objection to the Abstract of the Disclosure has been taken into account in the present amendment. It is respectfully submitted that the revised Abstract included in the enclosed

Substitute Specification is clear, concise, and in compliance with formal requirements. The Examiner is respectfully requested to withdraw the objection to the Abstract.

- 7) Referring to sections 4 and 5 on pages 3 to 6 of the Office Action, the present amendment of the specification to prepare the enclosed Substitute Specification has taken into account the typical section headings and other formal requirements of a U. S. application text. The Examiner is respectfully requested to withdraw the objection to the specification.
- 8) Referring to section 6 on pages 7 to 15 of the Office Action, the rejection of original translated claims 1 to 5 and 13 to 19 as indefinite under 35 U.S.C. §112, second paragraph has been obviated by the cancellation of those informal claims. The new claims 20 to 44 have been drafted "from the ground up" as a fresh approach at covering the invention so as to particularly point out and distinctly claim the inventive subject matter in compliance with 35 U.S.C. §112, second paragraph. The particular indefinite aspects pointed out in the original translated claims have been avoided in the present new claims. The Examiner is respectfully requested to withdraw the rejection of claims 1 to 5 and 13 to 19 as indefinite under 35 U.S.C, §112, second paragraph, because this rejection does not apply against any of the new claims.
- 9) At page 8, lines 8 to 18 and page 9, lines 8 to 18, the Examiner has discussed two possible interpretations of the claim terms

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"film outer wall surface" and "film inner wall surface" of the original claims, and has then selected one interpretation for the examination of the claims. It is respectfully submitted that the Examiner has selected the incorrect interpretation, especially with reference to the embodiment of present Fig. 3. Namely, especially with reference to Fig. 3, the "film outer wall surface" and the "film inner wall surface" do refer to the inside and outside surfaces of one film wall. This difference in interpretation has been clarified in the new claims, and is also significant for distinguishing the invention over the prior art, as will be discussed below.

- 10) Before addressing the particular prior art rejections and comparing the claimed features of the invention to the prior art disclosures, the invention will first be discussed in general terms to provide a background.

The present invention is generally directed to an insulation packet as well as an insulation arrangement including such an insulation packet arranged in an interspace between an outer skin and an inner trim component of an air vehicle such as an aircraft. The insulation packet includes an insulation material and a film that completely surrounds and encases the insulation material. The most important aspects of the invention relate to the water vapor permeability characteristics of the film.

According to a first aspect of the invention, the film has different diffusion resistances with respect to water vapor diffusing therethrough, depending on the direction of the diffusion. Preferably, the film has a greater diffusion resistance

in an inward diffusion direction of water vapor diffusing through the film into the insulation packet, and a lower diffusion resistance in an outward diffusion direction of water vapor diffusing through the film out of the insulation packet. Most preferably, the film allows water vapor to pass out of the insulation packet, while acting as a vapor barrier to block the passage of water vapor into the insulation packet. In this regard, please see Fig. 3 including the legend of Fig. 3, as well as the original specification at page 5, line 23 to page 6, line 19 and page 10, lines 20 to 24. Thus, the film covering the present insulation packet has a directionally dependent differential diffusion characteristic, e.g. blocking water vapor diffusion into the packet while allowing water vapor diffusion out of the packet. Such a directionally dependent differential diffusion characteristic is neither disclosed nor suggested by the prior art.

According to a second feature of the invention, the film includes a first film section on the side of the packet oriented toward the outer skin of the aircraft, and a second film section on a side of the packet oriented toward the inner trim component of the aircraft. The second film section has a high resistance to water vapor diffusion, so that it acts as a water vapor barrier to hinder the permeation of water vapor into the insulation packet on the side oriented toward the inner trim component of the aircraft. On the other hand, the first film section allows the permeation of water vapor out of the insulation packet on the side oriented toward the outer skin of the aircraft. Such a structure and orientation of an insulation packet in the wall of an aircraft is neither disclosed nor suggested by the prior art.

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Particularly, such an orientation of the insulation packet is directly contrary to the teachings and suggestions of U. S. Patent 5,472,760 (Norvell '760) (even considering col. 6, lines 51 to 57) as will be discussed below.

11) Referring to sections 7 to 9 on pages 15 to 20 of the Office Action, the rejections of the original claims 1 to 5 and 13 to 19 as anticipated by or obvious over U. S. Patent 5,472,760 (Norvell '760), U. S. Patent 5,398,889 (White et al.) and U. S. Patent 5,126,380 (Stahlke et al.) have been obviated by the cancellation of the original claims. Nonetheless, these references and the basis of each of these rejections will now be discussed in comparison to the new claims 20 to 44, in which the inventive subject matter has been more clearly defined. The new claims include independent claims 20, 21, 31 and 44, which each individually define a different combination of inventive features. Accordingly, each of the independent claims 20, 21, 31 and 44 will be discussed individually in comparison to the prior art.

12) New independent claim 20 is directed to an insulation packet comprising an insulation material completely surrounded and encased by a directionally selectively permeable film.

The film has a directional diffusion characteristic comprising two different diffusion resistances with respect to water vapor diffusing through the film respectively in two opposite directions. The prior art does not disclose and would not have suggested such a directional diffusion characteristic of a film

covering an insulation packet, and such a feature has not been substantively addressed in the Office Action.

When discussing the lack of clarity and the interpretation of the original claims, the Examiner addressed the original claim terms "film outer wall surface" and "film inner wall surface" at page 8, lines 8 to 18 and page 9, lines 8 to 18 of the Office Action. The Examiner recognized that this limitation can be understood to refer to the inner surface and the outer surface of one film wall, as one possible interpretation. The Examiner, however, selected a different interpretation for the examination of the claims. It is the former interpretation that is intended and that has now been clarified in new independent claim 20, namely that one film has different diffusion resistances depending on the direction of diffusion of water vapor through the film. As mentioned above, the Examiner has not substantively addressed such a feature in the rejections.

Norvell '760 discloses the arrangement of an insulation packet in the wall of a vehicle, for example an aircraft. The insulation packet preferably has a water vapor permeable film (16) on one side thereof, and an impermeable water vapor barrier film (18) on the other side thereof. Thus, Norvell '760 merely discloses the use of different films with different permeability on the respective opposite sides of the insulation packet. Norvell '760 neither discloses nor suggests the use of a film that has a directional diffusion characteristic with different diffusion resistances depending on the direction of diffusion of water vapor through the film. To the contrary, Norvell '760 makes clear that the "breathable" film (16) is "breathable" or

permeable by water vapor in both directions, namely so that water vapor will readily pass into and out of the insulation packet through this film (16) (see e. g. col. 4, lines 20 to 23).

White et al. was cited only in connection with the formation of air spaces through or along stringers of an aircraft fuselage to allow liquid condensate to flow and drain downwardly along the inside surface of the skin. White et al. does not disclose or suggest anything with regard to the directional diffusion characteristic of a film of an insulation packet as presently claimed.

Stahlke et al. was cited only in connection with the use of polyphenylene sulfide as a structural foam material. Stahlke et al. does not disclose or suggest anything relating to a directional diffusion characteristic of a film of an insulation packet as presently claimed.

Therefore, even a combined reading of the references would have provided no suggestions and no motivation toward the invention of present claim 20.

- 13) New independent claim 21 is directed to an insulation packet comprising an insulation material that is completely surrounded and encased by a selectively permeable film.

The film has a first diffusion resistance with respect to water vapor diffusing through the film outwardly out of the insulation packet and a second diffusion resistance with respect to water vapor diffusing through the film inwardly into the insulation packet. Particularly, the second diffusion resistance (as to inward diffusion) is greater than the first diffusion resistance (as to outward diffusion). This selectively permeable

characteristic of the film ensures that water vapor can permeate or diffuse out of the insulation packet, while hindering the diffusion of water vapor into the packet.

As discussed above, the Norvell '760, White et al., and Stahlke et al. references neither disclose nor suggest such a feature. The only reference that is pertinent to the diffusion characteristics of a film of an insulation packet, namely Norvell '760, expressly teaches using a breathable film that is readily permeable by water vapor in both inward and outward diffusion directions. Thus, a person of ordinary skill in the art would have been led directly away from the invention of present claim 21.

- 14) The claims depending from claim 21 recite additional features that further distinguish the invention over the prior art, for example as follows.

Claim 22 makes clear that the film has both the first diffusion resistance and the second diffusion resistance uniformly at all locations on the film (see e.g. Fig. 3). The references would not have suggested such a film.

Claim 23 recites that the film has both the first diffusion resistance and the second diffusion resistance uniformly at all locations on both opposite major surfaces of the insulation packet. The references are silent or contrary to such a film and film arrangement.

Claim 24 recites that the film includes two film portions at opposite major surfaces of the packet, whereby the first film portion has the first diffusion resistance and the second film

portion has the second diffusion resistance. This relates to the embodiment of Fig. 2.

Claim 25 recites that the second diffusion resistance is high enough to prevent water vapor from diffusing through the film inwardly into the insulation packet, while the first diffusion resistance is low enough to allow water vapor to diffuse through the film outwardly out of the insulation packet. As discussed above, the references are silent or contrary with regard to such a directionally dependent diffusion characteristic.

Claims 26 and 27 recite that at least a portion of the film uniformly has both the first and second diffusion resistances.

Claims 28 and 29 recite that the insulation material is a flossy fleece, that especially consists of polyphenylene sulfide. While Stahlke et al. disclose the use of polyphenylene sulfide as a structural foam, the references would not have suggested the use of polyphenylene sulfide as a flossy fleece insulation material.

Claim 30 recites that a portion of the film having the greater diffusion resistance also has a greater thickness than a portion of the film having the lower diffusion resistance. This is directly contrary to the teachings of Norvell '760, whereby the breathable film (16) is thicker than the vapor barrier film (18).

- 15) Present new independent claim 31 is directed to an improvement of an insulation arrangement in an air vehicle, including an

outer skin, an inner trim component, an interspace therebetween, and an insulation packet disposed in the interspace.

The insulation packet includes a gas permeable film completely surrounding and encasing an insulation material. The film has an inner film surface facing inwardly toward the insulation material and an outer film surface opposite the inner film surface. The film has two different diffusion resistances with respect to gas diffusion through the film in two opposite directions, namely from the outer film surface to the inner film surface and from the inner film surface to the outer film surface, respectively.

As discussed above, the prior art does not disclose and would not have suggested such a directionally dependent differential gas diffusion resistance. Norvell '760 is directly to the contrary, namely the film (16) that allows water vapor diffusion therethrough is freely "breathable" and permeable by water vapor in both diffusion directions. There is no suggestion toward different diffusion resistances for the two opposite (inward and outward) diffusion directions. White et al. and Stahlke et al. are not relevant to such features.

- 16) The claims depending from claim 31 recite additional features that further distinguish the invention over the prior art, for example as follows.

Claim 32 expressly recites that the second diffusion resistance is greater than the first diffusion resistance. In other words, the film provides a greater resistance to gas diffusion from the outer film surface to the inner film surface, and a

lower resistance to diffusion by gas from the inner film surface toward the outer film surface. The references are silent in this regard.

Claim 36 recites that the insulation packet is oriented with a thinner film toward the outer skin of the air vehicle and a thicker film toward the inner trim component of the air vehicle. In this regard, the Examiner has referred to Fig. 3 of Norvell '760, in connection with col. 6, lines 49 to 60. The Examiner's reasoning in this regard is respectfully traversed in the context of an insulation arrangement in an air vehicle. While Norvell does disclose that "for some uses, it may be desirable..." to "turn around" the embodiment of the insulation packet shown in Fig. 3 (col. 6, lines 51 to 60), Norvell also expressly teaches in the context or application of an aircraft, that the exterior film (18) shall be a thinner impermeable vapor barrier film, while the inner film (16) shall be a thicker breathable film (col. 5, lines 50 to 66 in comparison to col. 6, lines 51 to 57; and also see col. 2, lines 45 to 48; col. 3, lines 53 to 56; and col. 4, lines 20 to 37). From these teachings and the overall context of the Norvell reference, a person of ordinary skill in the art would have understood that an insulation packet in an aircraft shall be arranged as shown and described in connection with Fig. 3, and not "turned around" as might be suitable "for some uses" other than aircraft.

Claim 37 defines a relationship of diffusion resistance coefficients in the two film sections on opposite sides of the insulation packet, with respect to the diffusion direction there-through. The discussion of Norvell '760 in connection with claim

36 above is pertinent here also. Namely, in the context of an insulation arrangement in an air vehicle Norvell '760 clearly and expressly requires that the exterior film (18) is a vapor barrier while the interior film (16) is breathable. That is directly contrary to present claim 37. The suggestion of Norvell '760 that the opposite or "turned around" orientation of the insulation packet might be suitable "for some uses" (col. 6, lines 49 to 60), clearly does not countermand the particularly discussed express example of an aircraft (see col. 5, lines 50 to 66 in comparison to col. 6, lines 51 to 57; and also see col. 2, lines 45 to 48; col. 3, lines 53 to 56; and col. 4, lines 20 to 37).

The preceding discussion of Norvell '760 also applies to present dependent claim 43.

- 17) Present new independent claim 44 is directed to an improved insulation arrangement in an aircraft, in which an insulation packet comprises an insulation material completely surrounded and encased by a film, and is arranged in an interspace between an inner trim component and outer skin of the aircraft.

The film includes a first film section on an outer side of the insulation packet oriented toward the outer skin and a second film section on an inner side of the insulation packet oriented toward the inner trim component. The second film section on the inner side is a water vapor barrier, while the first film section on the outer side is a water vapor permeable film.

The arrangement and orientation defined in present independent claim 44 is directly contrary to the arrangement that is expressly disclosed by Norvell '760 for use in an aircraft. As

discussed above, the alternative or "turned around" arrangement disclosed by Norvell at col. 6, lines 51 to 60 must be understood in the overall context of the disclosure of the reference as applying to "other uses" other than the outer wall of an aircraft, which is expressly discussed as requiring the arrangement shown in Fig. 3 (see col. 5, lines 50 to 66 in comparison to col. 6, lines 51 to 57; and also see col. 2, lines 45 to 48; col. 3, lines 53 to 56; and col. 4, lines 20 to 37. As an example, if a reference discloses that "aircraft are blue, and some vehicles are red", such a disclosure cannot be understood to mean that aircraft are red but rather that some vehicles other than aircraft are red.

In the Jepson-format claim 44, the preamble relating to the arrangement of an insulation packet in an aircraft is an express limitation of the claim and cannot be ignored. This feature or limitation regarding the orientation of an insulation packet in an aircraft is directly contrary to the express teachings of Norvell relating to the insulation of an aircraft.

- 18) For the above reasons, the subject matter of each independent claim 20, 21, 31 and 44, as well as the claims depending therefrom, is neither anticipated by nor obvious over the disclosures of Norvell '760, White et al., and Stahlke et al. The Examiner is respectfully requested to withdraw the rejections as inapplicable against any of the new claims.
- 19) The additional prior art made of record requires no particular comments because it has not been applied against the claims.

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- 20) Favorable reconsideration and allowance of the application, including all present claims 20 to 44, are respectfully requested.

Respectfully submitted,

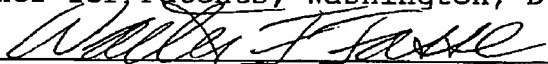
Gerhard SCHMITZ et al.
Applicant

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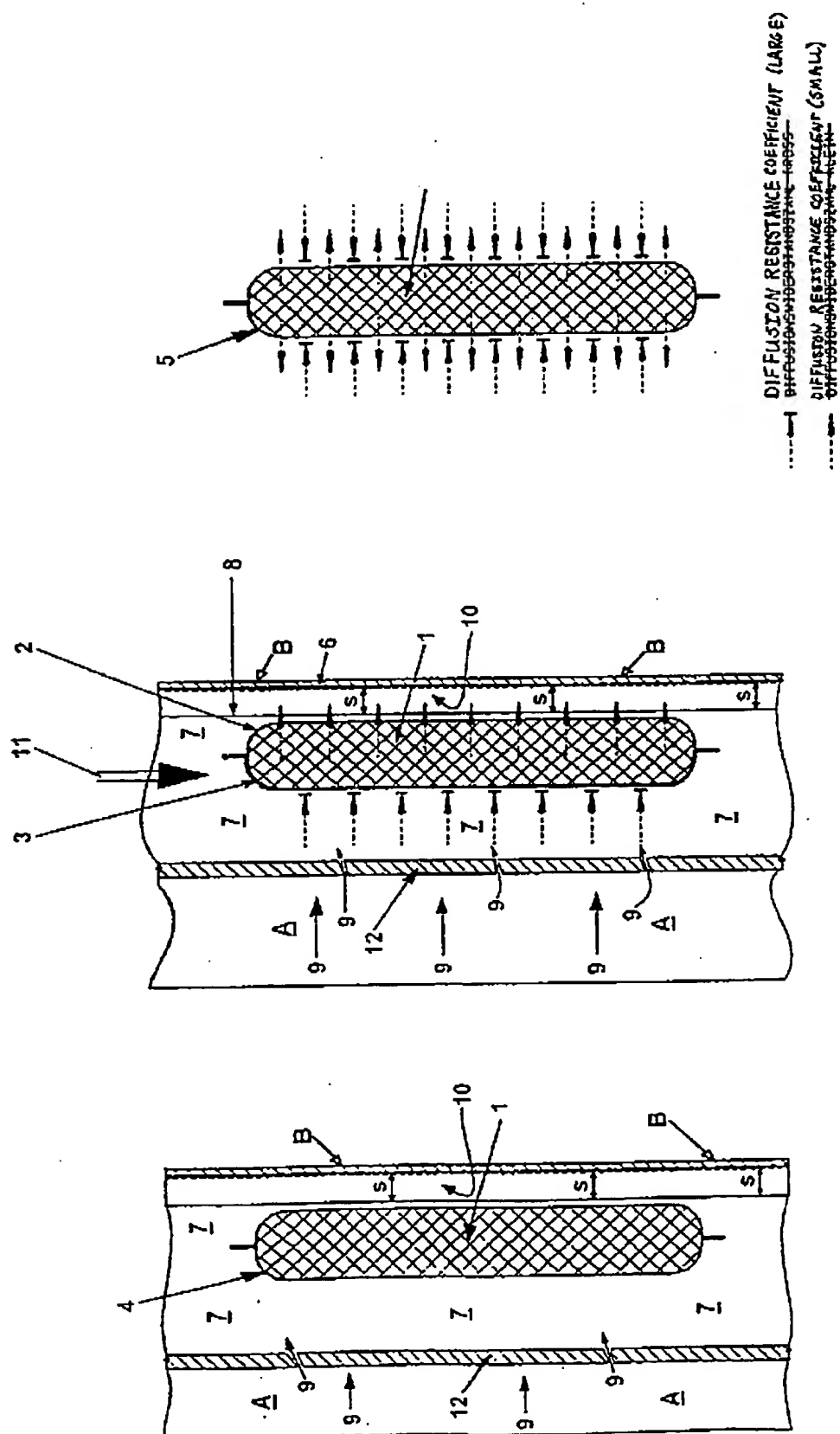


Fig. 3

Fig. 2

Fig. 1
PRIOR ART